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EK 538 216 787US

jc894 U.S. PTO 10/19/00

jc813 U.S. PTO 09/692392 10/19/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No. **AUS9-2000-0434-US1**
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:
Transmitted herewith for filing is the patent application of Inventor(s):

Kulvir Singh Bhogal, Baljeet Singh Baweja,
Nizamudeen Ishmael, Jr. and Mandeep Sidhu

For: **PRINT QUOTAS**

Enclosed are also:

X 13 Pages of Specification including an Abstract
X 4 Pages of Claims
X 4 Sheet(s) of Drawings
X A Declaration and Power of Attorney
X Form PTO 1595 and assignment of the invention to IBM Corporation

CLAIMS AS FILED

FOR	Number Filed		Number Extra		Rate		Basic Fee ($710)
Total Claims	21	-20 =	1	X	$ 18	=	$ 18.00
Independent Claims	3	-3 =	0	X	$ 80	=	$ 0.00
Multiple Dependent Claims	0			X	$270	=	$ 0.00
					Total Filing Fee	=	$ 728.00

X Please charge $728.00 to IBM Corporation, Deposit Account No. 09-0447.
X The Commissioner is hereby authorized to charge payment of the following fees associated with the communication or credit any over payment to IBM Corporation, Deposit Account No. 09-0447. A duplicate copy of this sheet is enclosed.
X Any additional filing fees required under 37CFR § 1.16.
X Any patent application processing fees under 37CFR § 1.17.

Respectfully,

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Docket No.AUS9-2000-0434-US1

PRINT QUOTAS

BACKGROUND OF THE INVENTION

1. Technical Field:

The present invention relates to printing in a network environment. More specifically, the present invention relates to controlling the amount of printing a network user may perform within a specified time period.

2. Description of Related Art:

In a computer network environment, network users must often share the same printing resources. In this type of environment, large print jobs can cause considerable problems. If several network users are attempting to use the same printer at roughly the same time, a large print job can delay several smaller, subsequent print jobs. This essentially allows one person to disrupt the work of several people, leading to considerable productivity problems for the entire network. If several people are attempting to print large print jobs, the congestion can become even more severe.

In addition to problems of delay and congestion, large print jobs require considerable resources, such as paper and ink/toner. In addition to the direct financial costs for these resources, there are also environmental concerns related to the production of paper waste.

Since many network users do not directly bear the costs of their large print jobs, there is not much of an incentive to control their own use of the printer resources. Many large print jobs, though convenient for the user, may not be necessary for the user's work, and

not worth the costs to network productivity as a whole.

Currently, there is no way for a computer network administrator to limit how many pages a network user may print within a specified time period. Therefore, a method for limiting the amount of printing a network user may perform within a specified time period, while allowing exceptions for necessary jobs, would be desirable.

SUMMARY OF THE INVENTION

The present invention provides a method for limiting the size of print jobs in a computer network by setting a predetermined quota for the number of pages a network user may print within a specified time period. If a print job submitted by a network user exceeds the print quota, the job will automatically be prevented from printing. If the submitted print job does not exceed the print quota, the job will be allowed to proceed. In one embodiment of the present invention, a network user may request special permission to exceed the print quota, if necessary.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 depicts a pictorial representation of a distributed data processing system in which the present invention may be implemented;

Figure 2 depicts a block diagram of a data processing system which may be implemented as a server, in accordance with the present invention;

Figure 3 depicts a block diagram of a data processing system in which the present invention may be implemented; and

Figure 4 depicts a flowchart illustrating a method for limiting the number of pages a network user may print within a specified period of time, in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the figures, and in particular with reference to **Figure 1**, a pictorial representation of a distributed data processing system is depicted in which the present invention may be implemented.

Distributed data processing system **100** is a network of computers in which the present invention may be implemented. Distributed data processing system **100** contains network **102**, which is the medium used to provide communications links between various devices and computers connected within distributed data processing system **100**. Network **102** may include permanent connections, such as wire or fiber optic cables, or temporary connections made through telephone connections. In the depicted example, server **104** is connected to network **102**, along with storage unit **106**. In addition, clients **108**, **110** and **112** are also connected to network **102**. These clients, **108**, **110** and **112**, may be, for example, personal computers or network computers.

For purposes of this application, a network computer is any computer coupled to a network that receives a program or other application from another computer coupled to the network. In the depicted example, server **104** provides data, such as boot files, operating system images and applications, to clients **108-112**. Clients **108**, **110** and **112** are clients to server **104**. Distributed data processing system **100** may include additional servers, clients, and other devices not shown. Distributed data processing system **100** also includes

printers **114**, **116** and **118**. A client, such as client **110**, may print directly to printer **114**. Clients such as client **108** and client **112** do not have directly attached printers. These clients may print to printer **116**, which is attached to server **104**, or to printer **118**, which is a network printer that does not require connection to a computer for printing documents. Client **110**, alternatively, may print to printer **116** or printer **118**, depending on the printer type and the document requirements.

In the depicted example, distributed data processing system **100** is the Internet, with network **102** representing a worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers consisting of thousands of commercial, government, education, and other computer systems that route data and messages. Of course, distributed data processing system **100** also may be implemented as a number of different types of networks such as, for example, an intranet or a local area network.

Figure 1 is intended as an example and not as an architectural limitation for the processes of the present invention.

Referring to **Figure 2**, a block diagram of a data processing system which may be implemented as a server, such as server **104** in **Figure 1**, is depicted in accordance with the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system

bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI local bus **216**. A number of modems **218-220** may be connected to PCI bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers **108-112** in **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, server **200** allows connections to multiple network computers. A memory mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may

be, for example, an IBM RS/6000, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

With reference now to **Figure 3**, a block diagram of a data processing system in which the present invention may be implemented is illustrated. Data processing system **300** is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures, such as Micro Channel and ISA, may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** may also include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter (A/V) **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. In the depicted example, SCSI host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, CD-ROM drive **330**, and digital video disc read only memory drive (DVD-ROM) **332**. Typical PCI local bus implementations will support three or four PCI

expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as AIX, which is available from International Business Machines Corporation. "AIX" is a trademark of International Business Machines Corporation. An object oriented programming system, such as Java, may run in conjunction with the operating system, providing calls to the operating system from Java programs or applications executing on data processing system **300**. Instructions for the operating system, the object-oriented operating system, and applications or programs are located on a storage device, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302.**

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. For example, other peripheral devices, such as optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. The depicted example is not meant to imply architectural limitations with respect to the present invention. For example, the processes of the present invention may be applied to multiprocessor data processing systems.

In reference to **Figure 4**, a flowchart illustrating a method for limiting the number of pages a network user may print within a specified period of time is depicted in accordance with the present invention. The present invention provides the network administrator with a

graphical user interface (GUI), which may be tied into the operating system. This administrative GUI allows the network administrator to set print quotas for network users (**step 401**). These quotas refer to the number of pages a network user may print within a specified period of time. Both the number of pages and the time period in question may be set by the network administrator. In addition, the administrator may set different print quotas for each network user, or a uniform quota for the entire network, depending on the specific needs of the network. Each user may also have a set of quotas, denoting different time intervals. For example, a user may have a quota for number of pages printed per hour, per day, and per week.

With the print quotas in place, a network user can then submit a print job to one of the network printers, such as, for example, printers **116** or **118** in **Figure 1** (**step 402**). The next step is to determine if the requested print job exceeds the user's specified print quota for that time period (**step 403**).

If the requested print job exceeds the user's print quota, the job will be denied and automatically prevented from printing (**step 404**). If the requested print job does not exceed the user's print quota, the job will be allowed to print (**step 407**). After printing is completed, the invention logs how much of the user's quota has been used (**step 408**).

In one embodiment of the present invention, provisions are made for exceeding print quotas when necessary. Taking into account the fact that predetermined quotas will not be able to perfectly anticipate future printing needs, the present invention

allows a network user to request special permission to exceed that user's print quota (**step 405**). This may be accomplished by means of, for example, a dialog box for submitting special requests to the network administrator. It is then up to the administrator to decide whether or not the user may exceed the print quota (**step 406**). If the administrator denies the special request, the print job in question will not be allowed to print (**step 404**). If the special request is granted, then the print job will be allowed to print (**step 407**).

Allowing special permission to exceed print quotas provides needed flexibility that cannot be accomplished with simple bright line rules, but still allows the administrator to minimize printing delays and the waste of limited resources. Special permission to exceed print quotas can also be automated and based on the total network printer use for that time interval, so that network administrators are not constantly bogged down with requests from users. In addition, special permission can be granted preemptively if a user is about to exceed his or her quota and network printer use is low for that time interval. In this way, the delay of having to process a formal request can be avoided.

By logging printer use for each network user in **step 408**, the network administrator can determine who the heaviest print users are. This information can be used to reign in users who might be wasting resources, or it could be used increase quotas for users with genuinely higher print requirements.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary

skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

CLAIMS:

What is claimed is:

1. A method for limiting the size of print jobs in a computer network, comprising:

setting a predetermined quota for the number of pages a network user may print within a specified time period;

receiving a print job request from a network user;

determining if the print job exceeds the predetermined print quota;

preventing the print job from printing if it exceeds the predetermined print quota; and

allowing the print job to print if it does not exceed the predetermined print quota.

2. The method according to claim 1, further comprising logging the amount of the user's print quota that is used.

3. The method according to claim 1, wherein the step of setting a predetermined print quota further comprises setting separate print quotas for different lengths of time.

4. The method according to claim 1, wherein the step of setting a predetermined print quota further comprises setting a single, uniform quota for all network users.

5. The method according to claim 1, wherein the step of setting a predetermined print quota further comprises setting individual print quotas for each network user.

6. The method according to claim 1, wherein a network user may request special permission to exceed the print quota.

7. The method according to claim 6, wherein the process of granting permission to exceed the print quota is automated.

8. A computer program product in a computer readable medium for use in a data processing system for limiting the size of print jobs in a computer network, the computer program product comprising:

instructions for setting a predetermined quota for the number of pages a network user may print within a specified time period;

instructions for receiving a print job request from a network user;

instructions for determining if the print job exceeds the predetermined print quota;

instructions for preventing the print job from printing if it exceeds the predetermined print quota; and

instructions for allowing the print job to print if it does not exceed the predetermined print quota.

9. The computer program product according to claim 8, further comprising instructions for logging the amount of the user's print quota that is used.

10. The computer program product according to claim 8, wherein the instructions for setting a predetermined print quota further comprise instructions for setting

separate print quotas for different lengths of time.

11. The computer program product according to claim 8, wherein the instructions for setting a predetermined print quota further comprise instructions for setting a single, uniform quota for all network users.

12. The computer program product according to claim 8, wherein the instructions for setting a predetermined print quota further comprise instructions for setting individual print quotas for each network user.

13. The computer program product according to claim 8, further comprising instructions for a network user to request special permission to exceed the print quota.

14. The computer program product according to claim 13, wherein the instructions for granting permission to exceed the print quota are automated.

15. An system for limiting the size of print jobs in a computer network, comprising:

means for setting a predetermined quota for the number of pages a network user may print within a specified time period;

means for receiving a print job request from a network user;

means for determining if the print job exceeds the predetermined print quota;

means for preventing the print job from printing if it exceeds the predetermined print quota; and

means for allowing the print job to print if it does

not exceed the predetermined print quota.

16. The system according to claim 15, further comprising means for logging the amount of the user's print quota that is used.

17. The system according to claim 15, wherein the means for setting a predetermined print quota further comprises means for setting separate print quotas for different lengths of time.

18. The system according to claim 15, wherein the means for setting a predetermined print quota further comprises means for setting a single, uniform quota for all network users.

19. The system according to claim 15, wherein the means for setting a predetermined print quota further comprises means for setting individual print quotas for each network user.

20. The system according to claim 15, further comprising means for a network user to request special permission to exceed the print quota.

21. The system according to claim 16, wherein the means for granting permission to exceed the print quota is automated.

ABSTRACT OF THE DISCLOSURE

PRINT QUOTAS

A method for limiting the size of print jobs in a computer network by setting a predetermined quota for the number of pages a network user may print within a specified time period is provided. If a print job submitted by a network user exceeds the print quota, the job will automatically be prevented from printing. If the submitted print job does not exceed the print quota, the job will be allowed to proceed. In one embodiment of the present invention, a network user may request special permission to exceed the print quota, if necessary.

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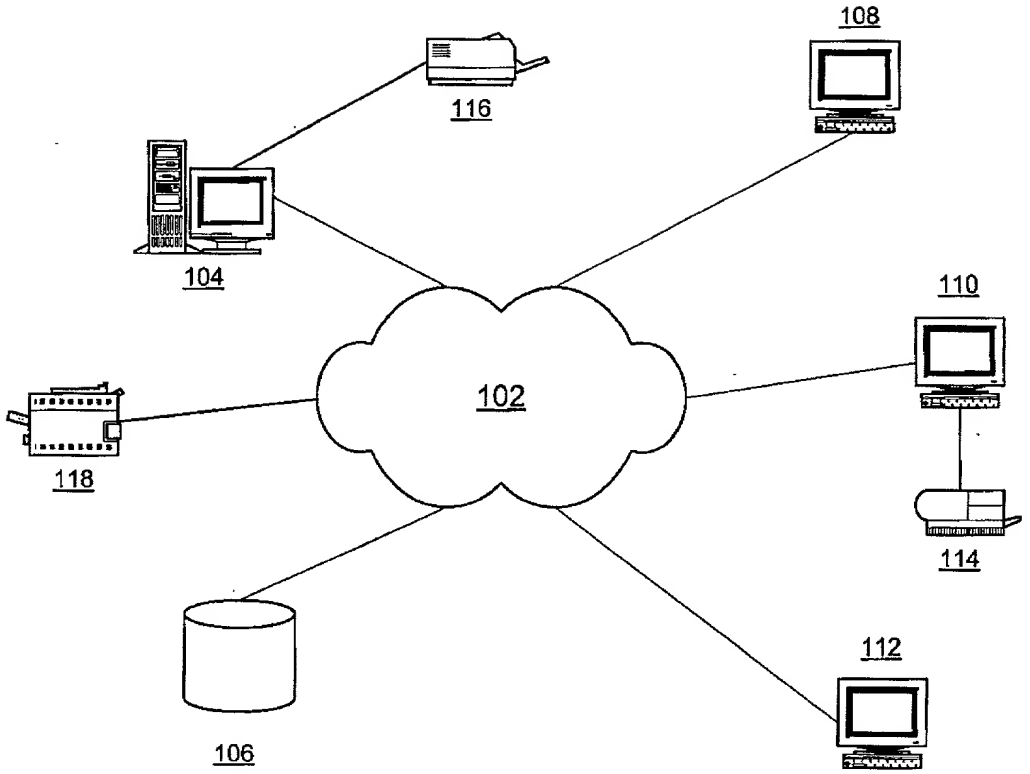
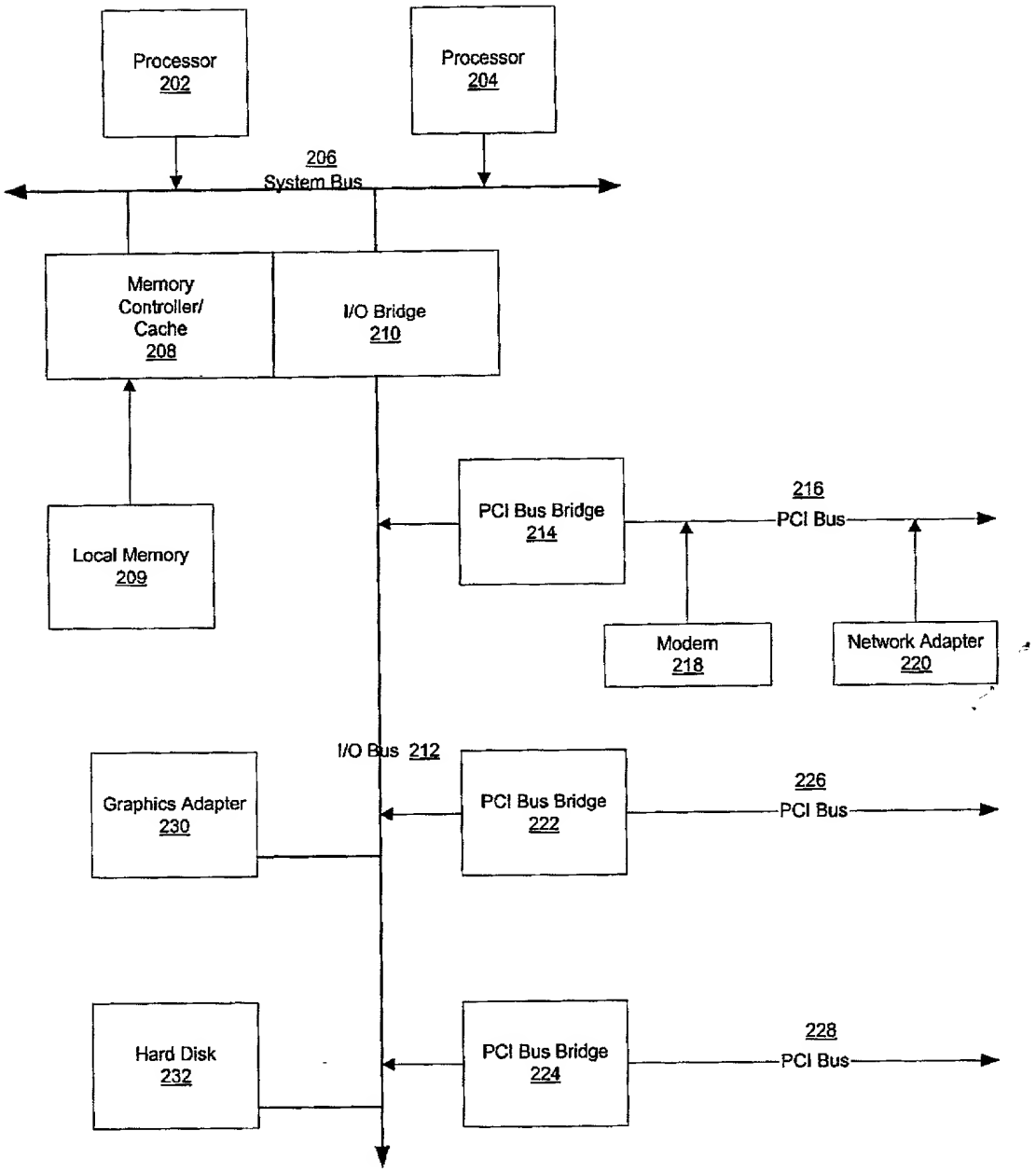


100

Network

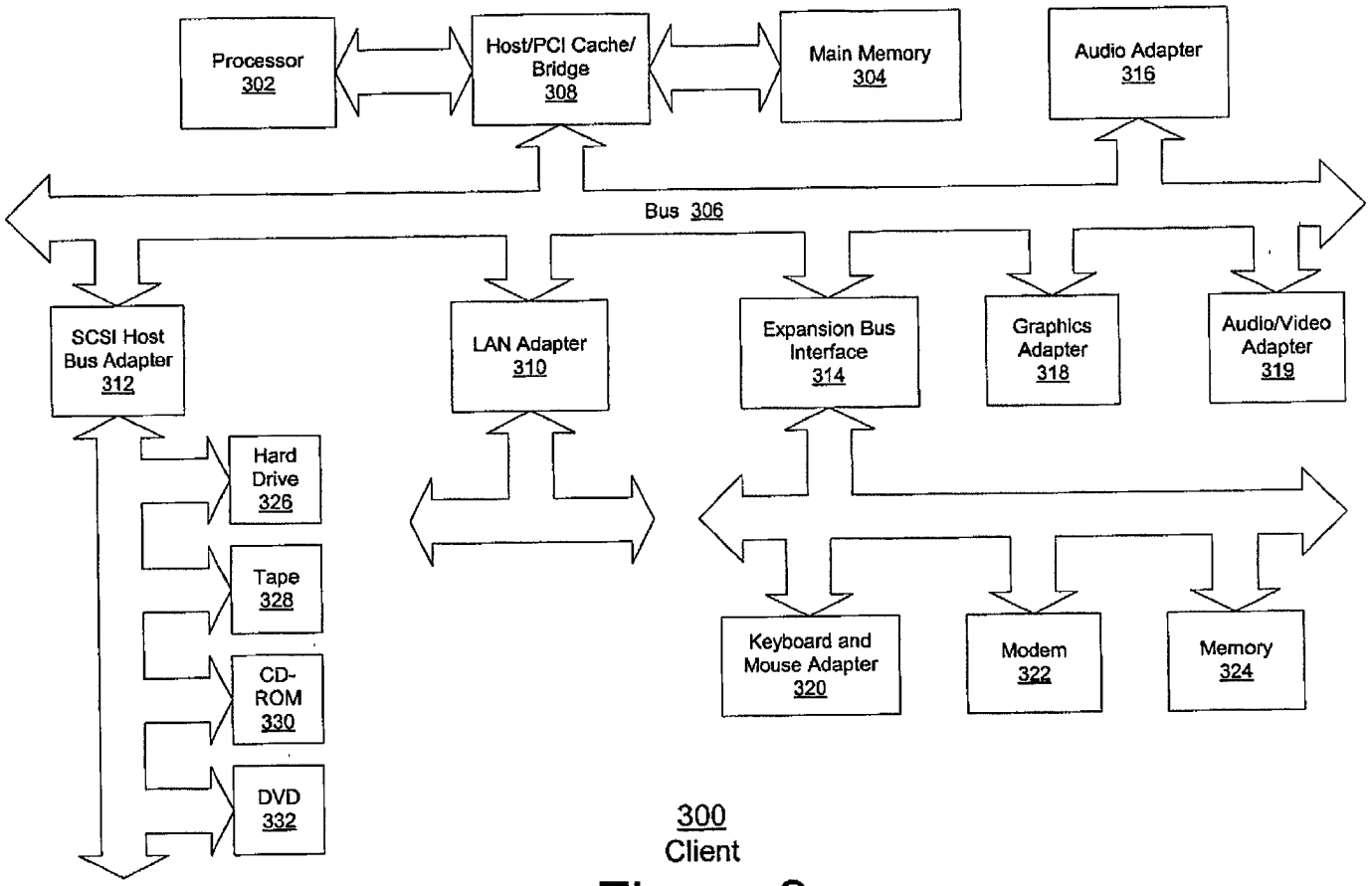
Figure 1



200
Server

Figure 2

20STAT* 6823650



300
Client

Figure 3

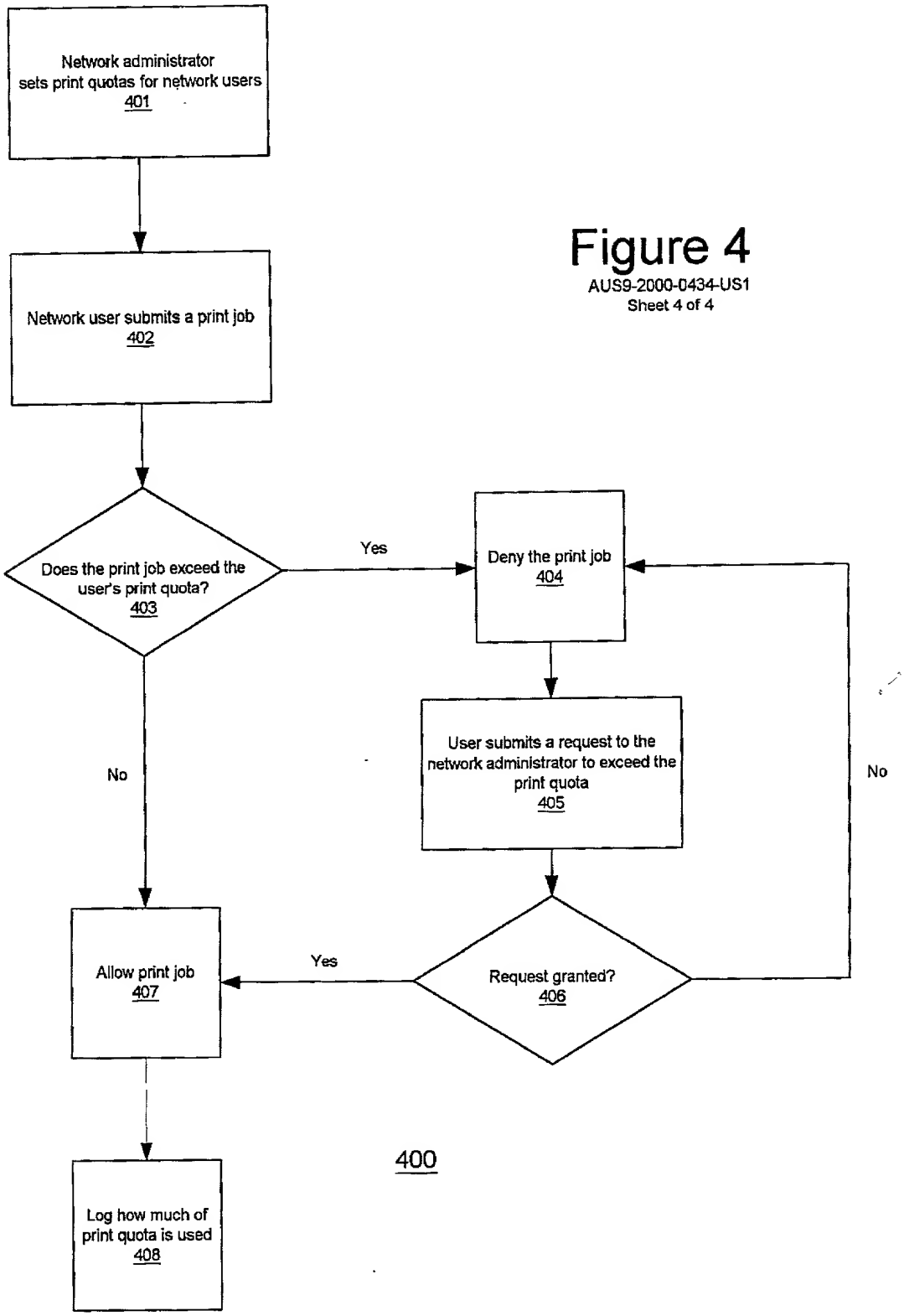


Figure 4

AUS9-2000-0434-US1
Sheet 4 of 4

DOCKET NUMBER: AUS9-2000-0434-US1

DECLARATION AND POWER OF ATTORNEY FOR

PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PRINT QUOTAS

the specification of which (check one)

X is attached hereto.

__ was filed on _____
as Application Serial No._____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):			Priority Claimed
_____ (Number)	_____ (Country)	_____ (Day/Month/Year)	___ Yes___ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

DOCKET NUMBER: AUS9-2000-0434-US1

(Application Serial #)	(Filing Date)	(Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

0ohn W. Henderson, Jr., Reg. No. 26,907; Thomas E. Tyson, Reg. No. 28,543; James H. Barksdale, Jr., Reg. No. 24,091; Casimer K. Salys, Reg. No. 28,900; Robert M. Carwell, Reg. No. 28,499; Douglas H. Lefeve, Reg. No. 26,193; Jeffrey S. LaBaw, Reg. No. 31,633; David A. Mims, Jr., Reg. 32,708; Volel Emile, Reg. No. 39,969; Anthony V. England, Reg. No. 35,129; Leslie A. Van Leeuwen, Reg. No. 42,196; Christopher A. Hughes, Reg. No. 26,914; Edward A. Pennington, Reg. No. 32,588; John E. Hoel, Reg. No. 26,279; Joseph C. Redmond, Jr., Reg. No. 18,753; Marilyn S. Dawkins, Reg. No. 31,140; Mark E. McBurney, Reg. No. 33,114; Duke W. Yee, Reg. No. 34,285; Colin P. Cahoon, Reg. No. 38,836; Stephen R. Loe, Reg. No. 43,757; Stephen J. Walder, Jr., Reg. No. 41,534; Charles D. Stepps, Jr., Reg. No. 45,880; and Stephen R. Tkacs, Reg. No. P-46,430.

Send correspondence to: Duke W. Yee, Carstens, Yee & Cahoon, LLP, P.O. Box 802334, Dallas, Texas 75380 and direct all telephone calls to Duke W. Yee, (972) 367-2001

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INVENTORS SIGNATURE: Kulvir Singh Bhogal DATE: 10/4/00

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DOCKET NUMBER: AUS9-2000-0434-US1

FULL NAME OF THIRD: Nizamudeen Ishmael, Jr.

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FULL NAME OF FOURTH INVENTOR: Mandeep Sidhu

INVENTORS SIGNATURE:_____ DATE:_____

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Austin, Texas 78723

CITIZENSHIP: United States

POST OFFICE ADDRESS: SAME AS ABOVE

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DECLARATION AND POWER OF ATTORNEY FOR

PATENT APPLICATION

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PRINT QUOTAS

the specification of which (check one)

X is attached hereto.

___ was filed on _____
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and was amended on _____
(if applicable)

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Prior Foreign Application(s):			Priority Claimed
(Number)	(Country)	(Day/Month/Year)	___ Yes___ No

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(Application Serial #)	(Filing Date)	(Status)

DOCKET NUMBER: AUS9-2000-0434-US1

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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FULL NAME OF SOLE OR FIRST INVENTOR: Kulvir Singh Bhogal

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CITIZENSHIP: United States

POST OFFICE ADDRESS: SAME AS ABOVE

FULL NAME OF SECOND INVENTOR: Baljeet Singh Baweja

INVENTORS SIGNATURE:_____ DATE: 10-05-2000

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CITIZENSHIP: United States

POST OFFICE ADDRESS: SAME AS ABOVE

FULL NAME OF THIRD: Nizamudeen Ishmael, Jr.

INVENTORS SIGNATURE:_____ DATE: 10-5-2000

RESIDENCE: 13331 Black Canyon Drive
Austin, Texas 78729

CITIZENSHIP: United States

POST OFFICE ADDRESS: SAME AS ABOVE

FULL NAME OF FOURTH INVENTOR: Mandeep Sidhu

INVENTORS SIGNATURE: _____ DATE: October 18, 2000

RESIDENCE: 1071 Clayton, ~~#413~~ #420 MS;
Austin, Texas 78723

CITIZENSHIP: United States

POST OFFICE ADDRESS: SAME AS ABOVE

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